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The Changing Nature of Chinese Nuclear Strategy

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Andrew W. Hull

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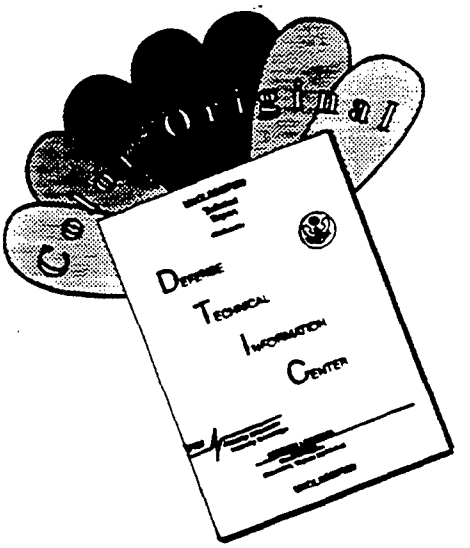

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PREFACE

As part of the Independent Research Program of the Institute for Defense Analyses (IDA), David Markov and Andrew Hull prepared a briefing on "The Changing Nature of the Chinese Nuclear Strategy" based on their understanding of the literature on the subject and lengthy discussions with Chinese defense experts.

The authors would like to acknowledge the generous assistance of Mr. David Tanks of the Institute for Foreign Policy Analysis (IFPA) for his insights and source materials on Chinese ballistic missiles characteristics and capabilities.

FOREWORD

This briefing was prepared by David Markov and Andrew Hull. It is based on their understanding of the literature on the subject and lengthy discussions with Chinese defense experts. In addition, the authors utilize their extensive knowledge of recent changes in Chinese defense industry and how those developments are effecting Chinese nuclear strategy. The observations in this briefing are strictly those of the authors and do not necessarily represent or imply endorsement by IDA or DoD. In addition, this document has not been formally reviewed.

SUMMARY

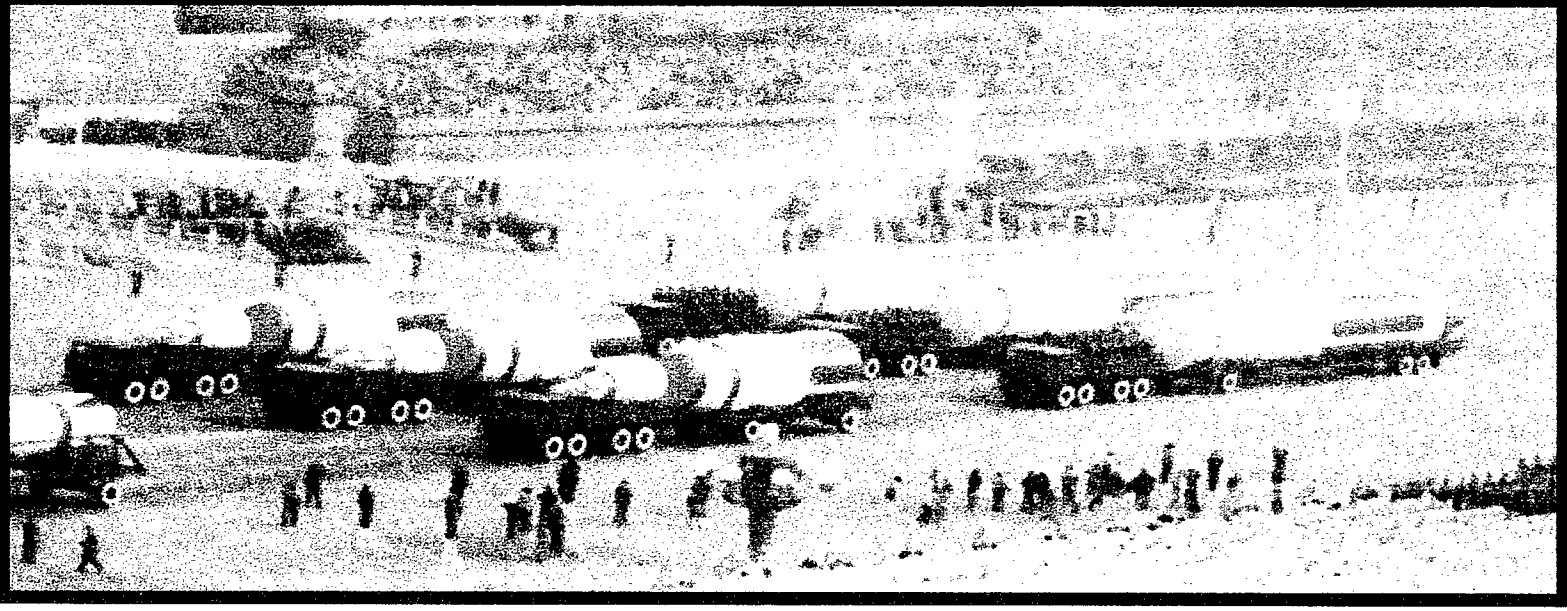
Traditionally, analysts have believed that China was only interested in pursuing a minimalist, counter-value nuclear strategy that aimed at achieving strategic deterrence. This paper presents a set of briefing slides that examine the possibility that Chinese nuclear strategy is changing in several major ways and that these changes have significant security implications for the United States. That is, it presents a *prima facia* case that the Chinese are moving to a nuclear warfighting strategy that embraces tactical, theater, and strategic nuclear weapons. There is also evidence suggesting that the Chinese are shifting from a counter-value to a counter-force strategic nuclear doctrine. Admittedly, however, there are other possible explanations for recent Chinese behavior. Those explanations notwithstanding, prudent planning dictates that the United States consider the broad-ranging political, security, and operational implications of such a fundamental shift in Chinese nuclear strategy and attendant capabilities.

The Changing Nature of Chinese Nuclear Strategy

David R. Markov and Andrew W. Hull

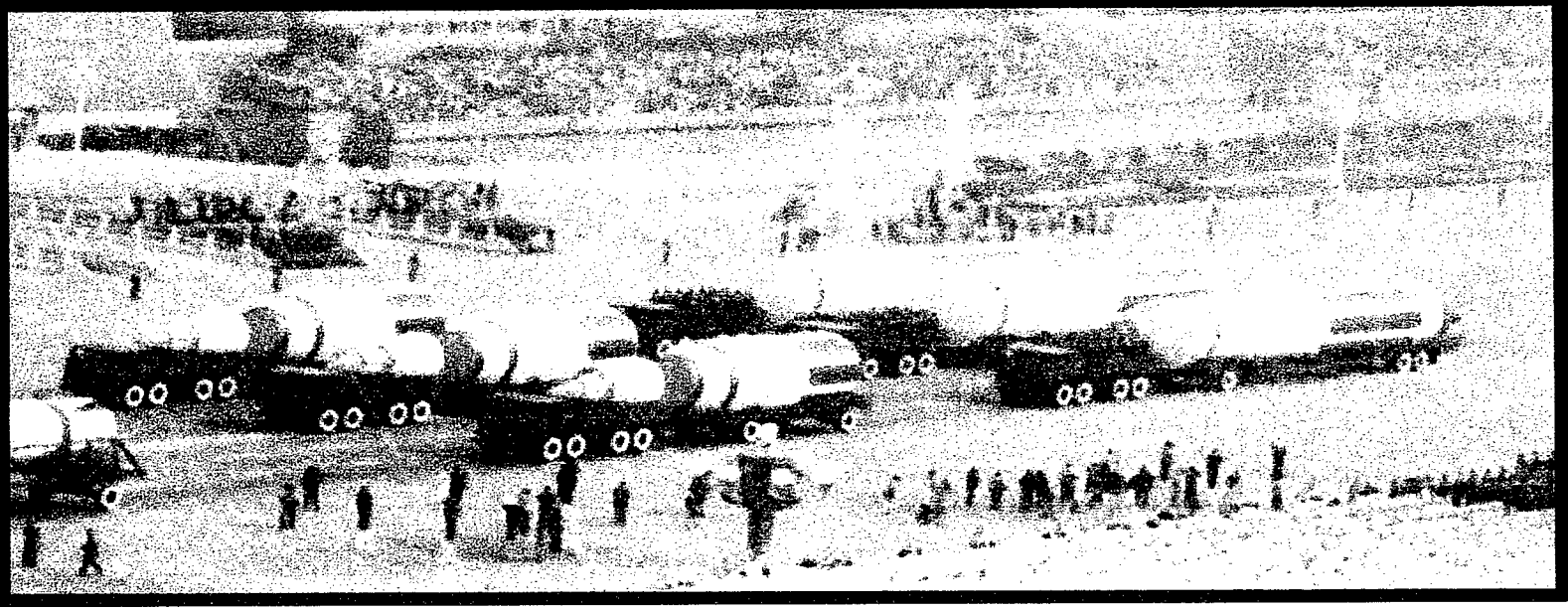
Overview

- A preliminary assessment and not the results of a study
- Hypothesized change in Chinese nuclear doctrine
- Requirements to implement new doctrine
- Open-source evidence of Chinese addressing new requirements
- Implications for US



Sources

- Jane's Space-Flight Directory
- Jane's Strategic Weapon Directory
- Kanwa Information Center (Internet)
- Foreign Broadcast Information Service (FBIS)
- Various Newspapers and Journals
- Other Sources



A Potential Paradigm Shift in Chinese Nuclear Thinking

- Thinking based on an article by Alastair Iain Johnston on "China's New 'Old Thinking': The Concept of Limited Deterrence"
- Johnston suggests that in the last 5 to 10 years, a major paradigm shift has taken place in Chinese nuclear strategy
- For China, limited deterrence now rests on a limited warfighting capability
- China appears to be moving away from a countervailing to a counterforce nuclear strategy

China's New Limited Deterrence Strategy

Johnston's view of China's limited deterrence strategy:

- Limited deterrence will deter both conventional and nuclear conflicts
- China must maintain a nuclear arsenal capable of responding to tactical, theater, and strategic requirements
- If true, we should expect a shift of forces from a "strike-back assured destruction posture" toward a "limited deterrence warfighting strategy"
- This may, or may not, entail an increase in numbers, but will require an increase in qualitative capabilities
  - Numbers increases would be affected by:
    - Deployment of TMD systems
    - Speed and depth of START II implementation
    - Budgetary and political constraints

Chinese Difficulties in Implementing Their New Paradigm

Johnston believes that PLA strategists are:

- Struggling to link conventional and nuclear weapons with operational requirements of potential high-tech local wars over resources and territory on China's periphery
- Struggling to figure out how to integrate high-tech weapons with "long-distance striking power" so as to deter and, if necessary deny the adversary victory in any conceivable conventional or nuclear conflict
- Unhappy with the current countervailing second-strike deterrent posture
  - These doubts will be strengthened by the fielding of US BMD systems

Stated Chinese Requirements for Their Limited Deterrence Strategy

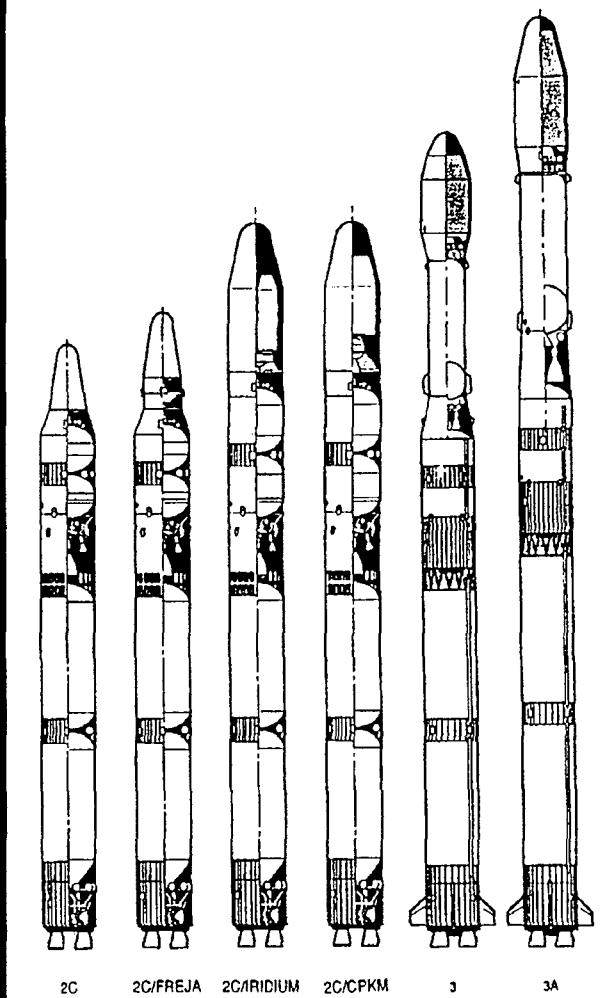
- Development of a wider range of tactical, theater and strategic nuclear devices and delivery methods
  - Tactical
    - Short-Range Ballistic Missiles (SRBM)
    - Artillery-Delivered Nuclear Munitions
  - Theater
    - Intermediate-Range Ballistic Missiles (IRBM)
    - Aircraft-Delivered Nuclear Gravity Bombs
    - Medium-Range Cruise Missiles (MRCM)
  - Strategic
    - Intercontinental Ballistic Missiles (ICBM)
    - Submarine-Launched Ballistic Missiles (SLBM)
    - Long-Range Cruise Missiles (LRCM)
- A requirement for space-based early warning and BMD capabilities

General Technical Warfighting Requirements

- Production Capacity
- C4I
- Readiness
- Payload
- Range
- Retargetability
- Reaction Time
- Penetration
- Collateral Damage
- Survivability
- Sustainability
- Multi-Strike Options from Tactical to Strategic

Production Capacity: Missiles

- Production of 10-12 DF-5A ICBMs per year
  - A total of 120-150 DF-5 ICBMs
  - Prototyping of DF-41 (DF-5 Follow-On) ICBM
- Production of 10-12 DF-21s IRBMs same as the JL-1 SLBM
  - A total of 10 DF-21s
  - A total of 60+ DF-3
  - 1 Xia SSBN with 12 JL-1 SLBMs
- Prototyping of the DF-31 IRBM same as the JL-2 SLBM

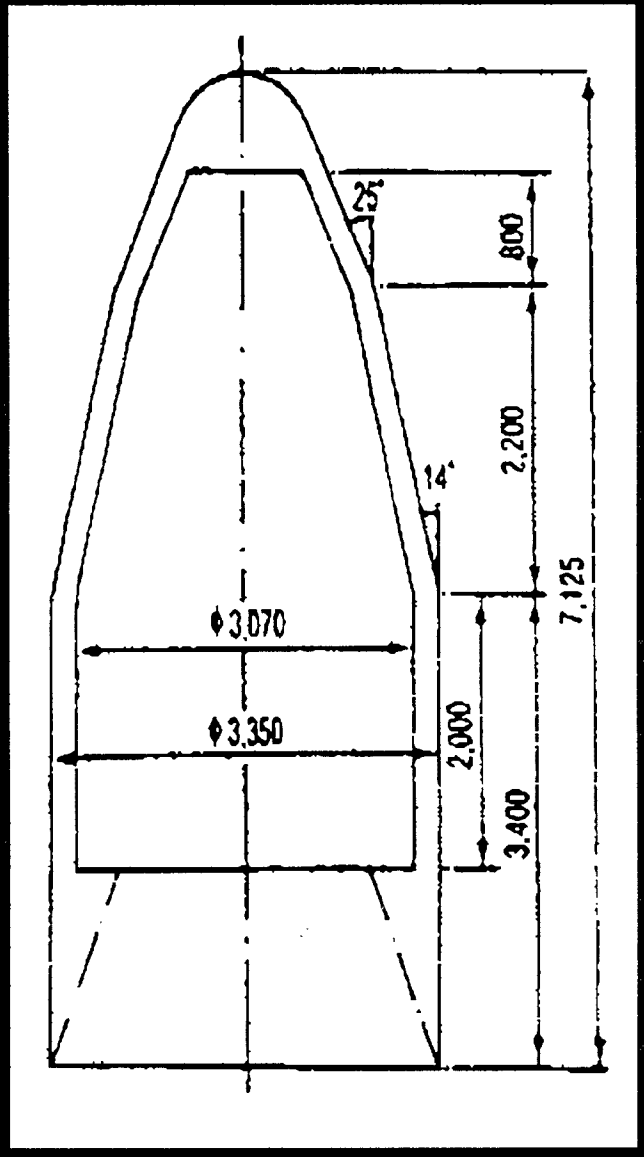


China's CZ launcher family. *(GWIC)*

Chinese Ballistic Missiles

Chinese Name	West Name	Range (KMs)	Warhead	Notes
DongFeng-1		600	1,500 KG HE	No longer in service
DF-2	CSS-1	1,250	20 KT Nuke	No longer in service
DF-3	CSS-2	2,650	3 MT Nuke	
DF-3A	CSS-2	2,800	Nuke	Multiple warheads
DF-4	CSS-3	4,750	2 MT Nuke	
DF-5	CSS-4	12,000	5 MT Nuke	
DF-5A	CSS-4	13,000	5 MT Nuke	
DF-6		19,000		Multiple warheads
DF-7		15,000		Multiple warheads
DF-11(M-11)	CSS-7	300	500 KG HE	
DF-15(M-9)	CSS-6	600	500 KG HE	
DF-21	CSS-5	1,800	500 KT Nuke	
DF-31				
M-7	CSS-8	180	500 KG HE	For export only
M-18			1,000 HE	For export only
JuLang-1	CSS-N-3	1,700	500 KT	Submarine launched
JL-2	CSS-NX-4	8,000	Multiple warheads	Submarine launched

Production Capacity: Warheads



- Production Rate:
  - 1980s: 110-120 weapons a year
  - 1990s: 140-150 weapons a year
- Production of U-235/Pu-239:
  - U-235 (800 Kilograms per Year)
    - Lanzhou Gaseous: 400 kg
    - Helanshan Centrifuge I: 400 kg
    - Helanshan Centrifuge II: ???
  - Pu-239 (400 Kilograms per Year)
    - Yumen Breeder Reactor: 250 kg
    - Baotou Breeder Reactor: 150 kg
    - Guangyuan Breeder Reactor: ???
- 2,350 Total Warheads
  - 550 Tactical Warheads
  - 1,800 Strategic Warheads

Chinese Nuclear Test Range

- Origin of nuclear weapons program: China officially decided to obtain nuclear weapons in 1955
- First nuclear test and present nuclear test site: 16 October 1964, Lop Nor test site in Xinjiang Province which is due west of Beijing, due north of Kathmandu
- Last two nuclear tests: 8 June and 29 July 1996
  - Still conducting nuclear tests
  - The testing program in 1995 involved warheads for two new missile systems:
    - On 15 May 1995, China tested the DF-21, a new ballistic missile with a range of 2,000 kilometers
    - On 17 August 1995, China tested a new sea-launched ballistic missile (JL-2) for deployment in late-1990s on its second generation strategic nuclear-powered submarine
- How many: 45 tests to date (23 atmospheric, 22 underground)
  - China is thought to have plans for at least two more nuclear tests in 1996
  - China has conducted one test on average every 284 days

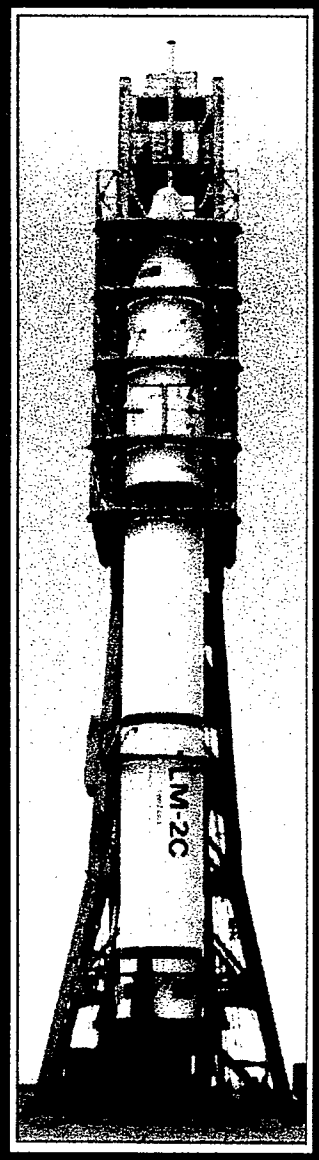
Chinese Nuclear Tests

dd/mm/yy	Type	Yield
16/10/64	atmospheric	22 kilotons (kt)
14/05/65	atmospheric	35 kt
09/05/66	atmospheric	250 kt
27/10/66	atmospheric	12 kt
28/12/66	atmospheric	122 kt
17/06/67	atmospheric	3,300 kt (first H-bomb)
24/12/67	atmospheric	15-25 kt
27/12/68	atmospheric	3,000 kt
23/09/69	underground	20 kt
29/09/69	atmospheric	3,000 kt
14/10/70	atmospheric	3,400 kt
18/11/71	atmospheric	15 kt
07/01/72	atmospheric	8 kt
18/03/72	atmospheric	170 kt
27/06/73	atmospheric	2,000-3,000 kt
17/06/74	atmospheric	200-1,000 kt
27/10/75	underground	
23/01/76	atmospheric	
26/09/76	atmospheric	200 kt
17/10/76	underground	10-20 kt
17/11/76	atmospheric	4,000 kt
17/09/77	atmospheric	
15/03/78	atmospheric	6-20 kt
14/10/78	underground	
14/12/78	atmospheric	
13/09/79	atmospheric	size unknown
16/10/80	atmospheric	200 - 1,000 kt
05/10/82	underground	3-15 kt
04/05/83	underground	size unknown
06/10/83	underground	20-100 kt
03/10/84	underground	15-70 kt
19/12/84	underground	5-50 kt
05/06/87	underground	size unknown
29/09/88	underground	1-20 kt
26/05/90	underground	15-65 kt
16/08/90	underground	50-200 kt
21/05/92	underground	660 kt
25/09/92	underground	1-20 kt
05/10/93	underground	40-80 kt
10/06/94	underground	10-60 kt
07/10/94	underground	40-150 kt
15/05/95	underground	90 kt

Chinese C4I Improvements

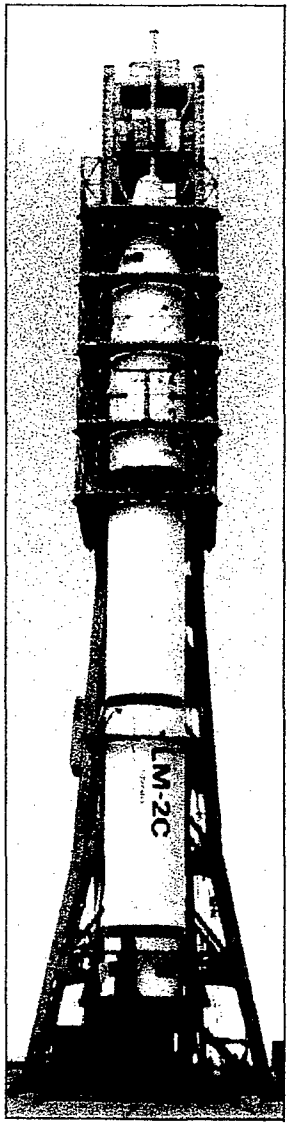
- Early Warning Satellites
  - China is interested in early-warning satellites and has consulted with Russia on acquiring an improved nuclear detection satellite
- Reconnaissance Satellites
  - China has launched a number of imaging satellites since 1975 and launched their last imaging satellite in 1993
- Chinese Telecommunications Systems
  - China had only 1,700 data communications users at the end of 1993; the number is now about 100,000, and will reach 120,000 by the end of 1996, becoming the core of the country's information network
  - ChinaPAC is expected to cover more than 3,600 cities and have 140,000 ports by the end of this year
  - There are a wide variety of opportunities for foreign firms to help China improve their civilian and military C4I infrastructure

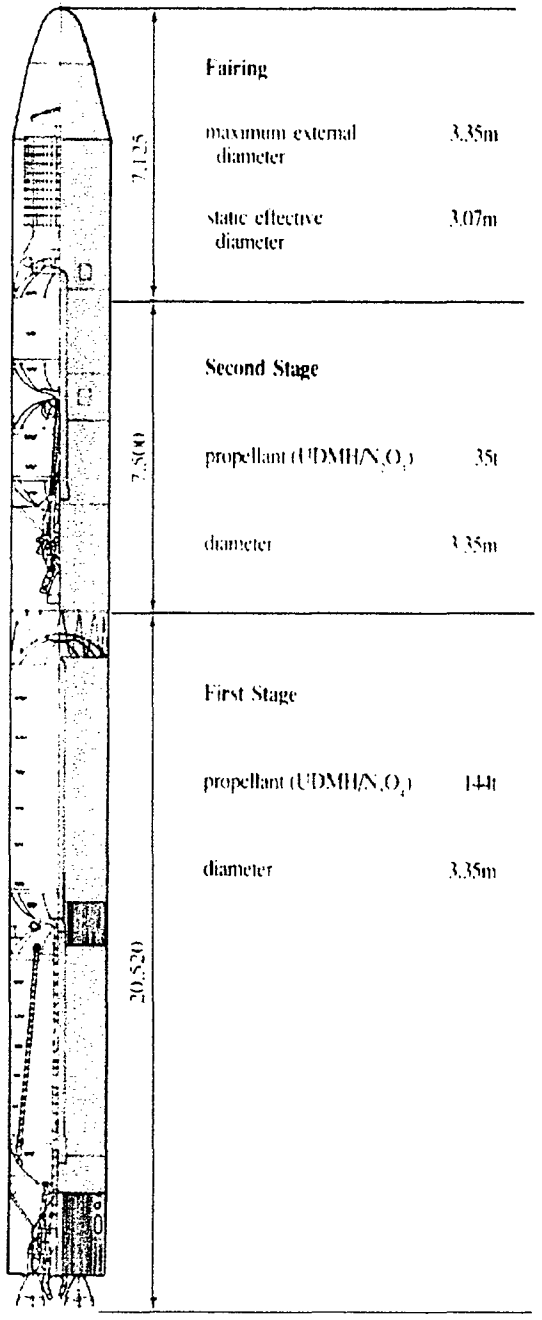
Chinese DF-5 ICBM Payload and Range Improvements



- China's ICBM is a SS-18-class DF-5 with a range of 8,000 to 15,000 miles
- Has the same boosters as the CZ-2C spy satellite with a launch success rate of 100% (no failure in 18 launches)
- The DF-5 entered into service in 1980 after extensive flight tests--at least 5 in 1979 alone
  - Payload is 4,400 kilograms with a single warhead, or 3,000 kilograms if MIRVed
    - Could handle a 10-megaton thermonuclear device (same size as SS-19)
    - China offered to launch 4 satellites on one CZ-2C which means that its twin, the DF-5, is also MIRV capable
    - MIRVing results in six 600 kg-weight warheads, each with a one-megaton thermonuclear device
- Attempting to acquire SS-18 technologies from the Ukraine (liquid-propellant) and Russia (guidance)

LM-2C





DF-5 Technical Specifications

DF-5/DF-5A:

- Length:
  - 32.60 m
- Body Diameter:
  - 3.35 kg
- Launch Weight:
  - 183,000 kg
- Payload:
  - 3,000-4,400 kg
- Range:
  - 8,000/15,000 km
- Warheads:
  - 1 RV/6 RVs
- Yield Warheads:
  - 10 MT/1 MT each
- Accuracy: 500 m CEP
- 2-Stage Liquid Propellant

Chinese Orbital Launch Record

	Date	Type	Site	Payload
1	24 Apr 70	CZ-1	JSC	DFH-1 test
2	3 Mar 71	CZ-1	JSC	SJ-1 test
3*	18 Sep 73	FB-1	JSC	unknown
4*	14 Jul 74	FB-1	JSC	unknown
5*	5 Nov 74	CZ-2	JSC	Recover FSW test
6	26 Jul 75	FB-1	JSC	JSSW-1 test
7	26 Nov 75	CZ-2C	JSC	FSW-0 1 imaging
8	16 Dec 75	FB-1	JSC	JSSW-2 science
9*	30 Aug 76	FB-1	JSC	JSSW-3 science
10	10 Nov 76	FB-1	JSC	unknown
11	7 Dec 76	CZ-2C	JSC	FSW-0 2 imaging
12	26 Jan 78	CZ-2C	JSC	FSW-0 3 imaging
13*	27 Jul 79	FB-1	JSC	unknown
14	19 Sep 81	FB-1	JSC	SJ-2/2A/2B science
15	9 Sep 82	CZ-2C	JSC	FSW-0 4 imaging
16	19 Aug 83	CZ-2C	JSC	FSW-0 5 imaging
17*	29 Jan 84	CZ-3	XSC	STTW-T1 comms test
18	8 Apr 84	CZ-3	XSC	STTW-T2 comms test
19	12 Sep 84	CZ-2C	JSC	FSW-0 6 imaging
20	21 Oct 85	CZ-2C	JSC	FSW-0 7 imaging
21	1 Feb 86	CZ-3	XSC	STTW-1 comms sat
22	6 Oct 86	CZ-2C	JSC	FSW-0 8 imaging
23	5 Aug 87	CZ-2C	JSC	FSW-0 9 imaging/µg
24	9 Sep 87	CZ-2C	JSC	FSW-1 1 imaging/µg
25	7 Mar 88	CZ-3	XSC	STTW-2 comms sat
26	5 Aug 88	CZ-2C	JSC	FSW-1 2 imaging/µg
27	6 Sep 88	CZ-4	TSC	FY-1A polar metsat
28	22 Dec 88	CZ-3	XSC	STTW-3 comms sat
29	4 Feb 90	CZ-3	XSC	STTW-4 comms sat
30	7 Apr 90	CZ-3	XSC	AsiaSat 1 comms sat
31	16 Jul 90	CZ-2E	XSC	test+Badr 1 (Pakistan)
32	3 Sep 90	CZ-4	TSC	FY-1B polar metsat
33	5 Oct 90	CZ-2C	JSC	FSW-1 3 imaging/µg
34*	28 Dec 91	CZ-3	XSC	STTW comms sat
35	9 Aug 92	CZ-2D	JSC	FSW-2 1
36	13 Aug 92	CZ-2E	XSC	Optus B1 comms sat
37	6 Oct 92	CZ-2C	JSC	FSW-1 4/Freja
38	21 Dec 92	CZ-2E	XSC	Optus B2 comms sat
39	8 Oct 93	CZ-2C	JSC	FSW-1 5 imaging/µg
40	8 Feb 94	CZ-3A	XSC	KF-1 + SJ-4
41	3 Jul 94	CZ-2D	JSC	FSW-2 2
42	21 Jul 94	CZ-3	XSC	APStar 1 comms sat
43	27 Aug 94	CZ-2E	XSC	Optus B3 comms sat
44	29 Nov 94	CZ-3A	XSC	DFH-3 comms sat
45	25 Jan 95	CZ-2E	XSC	APStar 2 comms sat

* indicates vehicle failure (Jan 1995 loss still to be attributed). JSC: Jiuquan Space Centre; XSC: Xichang Space Centre; TSC: Taiyuan Space Centre. Launch totals with number of failures in ( ): CZ-1:2(0); FB-1:8(4); CZ-2:1(1); CZ-2C:14(0); CZ-2D:2(0); CZ-2E:4(0); CZ-3:9(2); CZ-3A:2(0); CZ-4:2(0). A 2-stage CZ-1 appears to have been launched 10 Jan 1970 as a successful suborbital vehicle test. FB-1 also flew suborbital tests 10 Aug 1972, 14 Sep 1977 & 16 Apr 1978.

Chinese Orbital Launch Record

- 18 Successful Launches of the DF-5/CZ-2C
  - 5 launches in 1979 of DF-5
- DF-31 fired 8,000 km in May 1995 and June 1995
- Salvo-fired 4 DF-15s and 2 DF-21s from 21-26 July 1995
- Launched 15 Imaging Satellites from 1970 to 1995
- Launched 14 Commo Satellites from 1970 to 1995

DF-31: Survivability and Penetration

- Range of 8,000 kilometers
- Mounted on a road-mobile TEL
- Could strike the northwest portion of the United States
- System will be utilized on the follow-on JL-2 SLBM
- Very similar to the Russian SS-25 and/or SS-24 solid-propellant missile systems with three-stages (maybe utilizing Russian assistance)
- Carries a 700 kilogram warhead and will be ready sometime in 1996
- Requires only 30 minutes of maintenance to make ready for launch
- Wide-Ranging Countermeasures Available
  - Countermeasure program is at least 20 years old and on-going
    - Jammers and Submunitions

Strategic Force Survivability and Sustainability

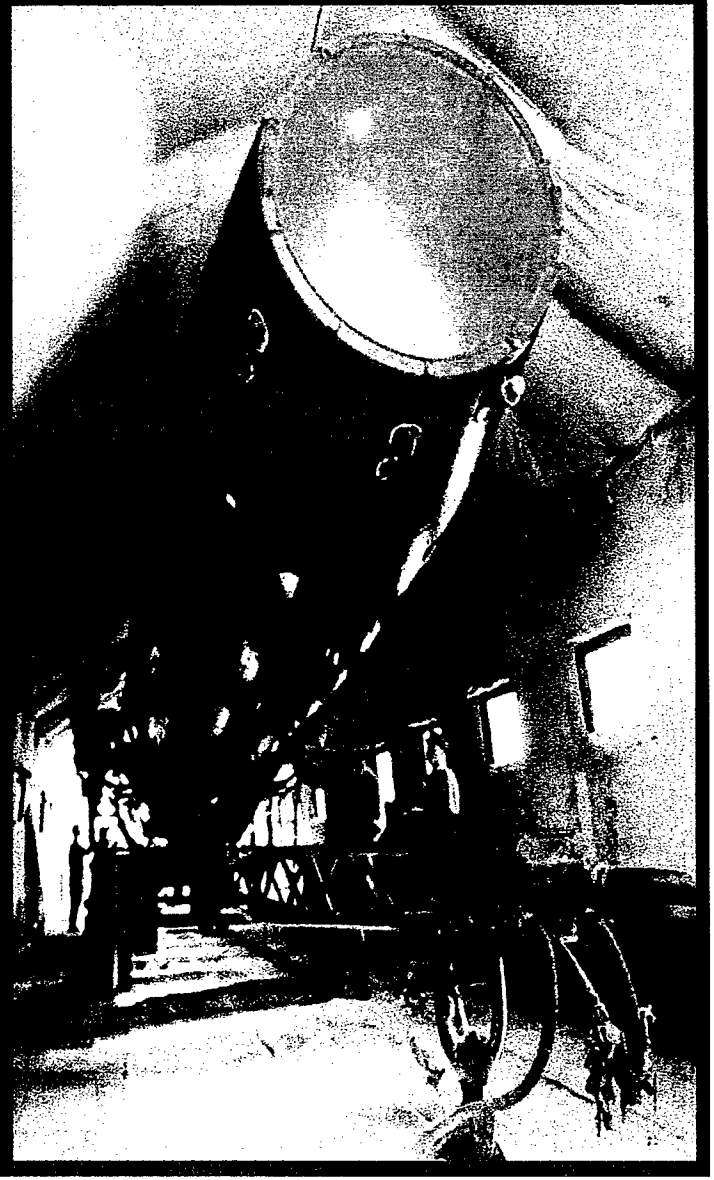
- Defenses
  - 100 SA-10 launchers placed around Beijing
- Multi-Basing and Hardening:
  - Tunnels (Great Wall Project)
    - 10 year project to build over 2,000 kms of underground tunnels, about 1,000 kms deep
    - Located in Tai-Hai Mountain Range between Hebei and Shanxi Province
    - Other tunnels are in central and southern China's mountain ranges
  - Silos
    - 10-18 Silo-Based DF-5
    - In 1994, improved silos and re-built a number of false shell-wells
  - Sea-based
    - JL-1/JL-2 SLBM-Based SSBNs

Strategic Force Survivability and Sustainability (Continued)

- Mobility Improvements by 2010
  - DF-31 Road-Mobile IRBM
  - DF-41 Road-Mobile ICBM
  - JL-1/JL-2 SLBMs from 3 to 4 SSBNs
- Quicker Response Time
  - Salvo-fired 4 DF-15s and 2 DF-21s on 21-26 July 1995
    - PLA strategists stated that unlike the Iraqi's single launch-mode in Desert Storm, China would launch its missiles in waves or salvos
  - Moving from liquids to solids propulsion
    - 1980s: DF-5 and DF-5A are storable liquid propellant systems
    - 1990s: DF-31 and DF-41 are solid-propellant missiles
- Training
  - In 1993, 1,500 scientific research projects were undertaken (900 won state prizes) on improving performance and training for missile weapons

Multi-Strike Options by 2010

- Strategic
  - DF-41 ICBMs
  - Jl-2 SLBMs (3-4 SSBNs)
- Theater
  - DF-31 IRBM
  - Cruise Missiles (CM)
    - Russian RK-55 (AS-15 Kent)
    - Indigenous CM
  - 150-160 Su-27 Flankers and possibly the Tu-22M Backfire
- Tactical
  - 200 FC-1/J-10 Multi-Role Fighters
  - 50-100 J-8II Multi-Role Fighters
  - Nuclear Torpedoes
  - Nuclear Artillery Projectiles



Other Explanations for China's Apparent Shift

Normal and Incremental Modernization

- Another possible interpretation of China's apparent shift is the normal process of modernization
- Modernization's intent is to improve China's nuclear force sustainability, reliability, and safety
- China's nuclear programs could simply be an effort to address long-standing concerns regarding the assurity of their nuclear delivery force

Maintaining Capability

- Current efforts may simply reflect China's wish to maintain their limited strike capability in step with other countries' nuclear force improvements

Conclusions

- There is a prima facia case for Johnston's hypotheses; however, there are other explanations for their actions
- If true, prudent planning dictates that the US needs to consider the broad-ranging political, security, and operational implications of such a fundamental shift in Chinese nuclear strategy/capabilities

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13. ABSTRACT (Maximum 200 words)
Traditionally, analysts have believed that China was only interested in pursuing a minimalist, counter-value nuclear strategy that aimed at achieving strategic deterrence. This paper examines the possibility that Chinese nuclear strategy is changing in several ways: (1) it is moving to embrace a nuclear warfighting approach that encompasses tactical, theater, and strategic nuclear weapons, and (2) it is moving from a counter-value to a counter-force strategic nuclear posture.

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